

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte JAMES C. JOSEPH, MICHAEL A. PIKULIN, and  
WILLIAM H. FRIEND

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Appeal No. 94-4357  
Application No. 07/739,050<sup>1</sup>

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ON BRIEF

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Before SOFOCLEOUS, PAK and OWENS, Administrative Patent Judges.

PAK, Administrative Patent Judge.

DECISION ON APPEAL

Joseph et al. (appellants) appeal from the examiner's refusal to allow claims 1, 2, 4 through 11, 13 through 20, 33 through 44 and 46 through 54, which are all of the claims remaining in the application. Claim 8 was amended subsequent to the final rejection.

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<sup>1</sup> Application for patent filed August 1, 1991.

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Claims 1, 8 and 13 are representative of the subject matter on appeal and read as follows:

1. A method for conditioning an ozone gas recycle stream in an ozone pulp bleaching process, comprising:

providing an oxygen containing feed gas to an ozone generator;

generating ozone from said feed gas to produce an ozone rich oxygen gas;

bleaching pulp with said ozone rich gas, thereby producing an exhaust gas containing contaminants including carbon dioxide;

removing at least some of said contaminants to produce a recycle gas;

directing said recycle gas into the ozone generator to provide at least a portion of said oxygen containing feed gas; and

removing carbon dioxide during said contaminant removal step to a level of about 6 wt.% to thus allow operation of the ozone generator at or approaching full capacity.

8. A method for conditioning an ozone gas recycle stream in an ozone pulp bleaching process, comprising:

providing an oxygen containing feed gas to an ozone generator;

generating ozone from said feed gas to produce an ozone rich oxygen gas;

bleaching pulp with said ozone rich gas, thereby producing an exhaust gas containing contaminants including carbon dioxide;

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removing at least some of said contaminants to produce a recycle gas; and

directing said recycle gas into the ozone generator to provide at least a portion of said oxygen containing feed gas;

wherein said step of removing contaminants comprises removing entrained pulp fibers from said exhaust gas; removing ozone and a portion of the carbon monoxide by passing the gas through a thermal destruct unit; removing hydrocarbons and the remaining carbon monoxide from the gas which exits the thermal destruct unit; purging a portion of the exhaust gas; forming the recycle gas by cooling and drying the unpurged portion of said exhaust gas; and mixing said recycle gas with fresh oxygen containing gas to form the feed gas, thus maintaining the concentration of carbon dioxide in the feed gas at a level of about 6 wt. % to allow approximately full capacity operation of the ozone generator.

13. A method for conditioning an ozone gas recycle stream in an ozone pulp bleaching process, comprising:

providing an oxygen containing feed gas to an ozone generator;

generating ozone from said feed gas to produce an ozone rich oxygen gas;

increasing the consistency of a pulp;

bleaching the increased consistency pulp with said ozone rich oxygen gas, thereby producing an exhaust gas containing contaminants including carbon dioxide;

producing a recycle gas by removing ozone and purging a portion of the exhaust gas to remove at least some of said contaminants including carbon dioxide in an amount sufficient to allow operation of the ozone generator at or approaching full capacity;

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directing at least a portion of the purged exhaust gas portion to surround the pulp during at least part of said pulp consistency increasing step, thereby displacing ambient air thereby reducing the nitrogen about the pulp with said exhaust gas;

filling voids between individual particles of said pulp with said exhaust gas as the consistency of the pulp is increased;

directing said increased consistency pulp with voids filled by said exhaust gas to the pulp bleaching step; and

directing said recycle gas into the ozone generator to provide at least a portion of said oxygen containing feed gas.

The references of record<sup>2</sup> relied upon by the examiner are:

Gessner 1970	3,525,665	Aug. 25,
Samuelson 09, 1973	3,764,464	Oct.
Fritzvold et al. (Fritzvold) 21, 1981	4,279,694	Jul.
Namba et al. (Namba) 1984	4,430,306	Feb. 07,
Griggs et al. (Griggs) 1992	5,164,043	Nov. 17,

Tritschler et al. (Tritschler), "Commercial Manufacture and Industrial Use of Ozone as an Oxidant," Ozone Technology

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<sup>2</sup> At page 2 of the Answer, the examiner inadvertently refers to a Canadian Patent as the only prior art "relied upon in the rejection [sic, rejections] of claims under appeal." However, the actual rejections set forth by the examiner at pages 2 through 5 of the final rejection and pages 3 through 8 of the Answer indicate that the examiner is relied upon the prior art references listed herein. This conclusion is also supported by appellants' Brief and Reply Brief.

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Group, Emery Industries, Inc., pp. 259-262 (unknown publication date) (hereinafter referred to as "Tritschler")<sup>3</sup>.

The appealed claims stand rejected under 35 U.S.C. § 103 as follows:

(1) Claims 1, 2, 4, 5, 15 through 17, 19 and 20 as unpatentable over the combined disclosures of Fritzvold and Namba;

(2) Claims 6, 7, 18, 33 through 36 and 51 through 54 as unpatentable over the combined disclosures of Fritzvold, Namba and Tritschler;

(3) Claims 8 through 11, 37 through 41, 44 and 45 as unpatentable over the combined disclosures of Fritzvold, Namba, Tritschler and Samuelson; and

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<sup>3</sup> Appellants have submitted this reference as prior art to comply with the duty of disclosure under Rule § 1.156. However, neither the examiner nor appellants has supplied the publication date for this reference. Nevertheless, we will presume it to be prior art since appellants have not only not challenged the examiner's reliance on it as prior art, but also submitted it as prior art. Upon return of this application, we advise both the examiner and appellants to supply the publication date for this reference to complete the record of this application.

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(4) Claims 13, 14, 42, 43 and 46 through 50 as unpatentable over the combined disclosures of Fritzvold, Namba, Tritschler, Griggs and Gessner.

We have carefully reviewed the entire record, including all of the arguments advanced by the examiner and appellants in support of their respective positions. This review leads us to conclude that only the examiner's § 103 rejections of claims 1, 2, 4 through 7, 15 through 20, 33 through 36 and 51 through 54 are well-founded. Accordingly, we will sustain only those § 103 rejections directed to claims 1, 2, 4 through 7, 15 through 20, 33 through 36 and 51 through 54. We add the following primarily for emphasis.

At the outset, we note that appellants have grouped the claims on appeal as follows:

Group I - Claims 1, 2, 4 through 7, 15 through 20, 33 through 36 and 51 through 54;

Group II - Claims 8 through 11 and 39 through 44;

Group III - Claims 13, 14, 37, 38 and 46 through 50.

Therefore, we will limit our discussion to the broadest claim in each group, namely claims 1, 8 and 13. See 37 CFR § 1.192(c)(5)(1993).

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Under 35 U.S.C. § 103, the obviousness of an invention cannot be established by combining the teachings of the prior art absent some teaching, suggestion or incentive supporting the combination. See ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). This does not mean that the cited prior art must specifically suggest making the combination. See B.F. Goodrich Co. v. Aircraft Braking Systems Corp., 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996); In re Nilssen, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988). Rather, the test for obviousness is what the combined teachings of the prior art references would have suggested to those of ordinary skill in the art. In re Young, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991); In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). Moreover, in evaluating such prior art references it is proper to take into account not only the specific teachings of the prior art references but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. In re Preda, 401 F.2d 825, 826,

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159 USPQ 342, 344 (CCPA 1968). All of the disclosures in a reference must be evaluated for what they would have fairly suggested to one having ordinary skill in the art. In re Boe, 355 F.2d 961, 965, 148 USPQ 507, 510 (CCPA 1966).

In rejecting the subject matter of claims 1, 2, 4 through 7, 15 through 20, 33 through 36 and 51 through 54 under 35 U.S.C. § 103, the examiner states (Answer, page 3):

FRITZVOLD ET AL teaches adding an oxygen containing feed gas to an ozone generator (9c), generating ozone from the oxygen containing feeds gas (9c), bleaching pulp with the ozone gas generated (5c), recycling exhaust gas and removing CO<sub>2</sub> (see (9c) "Organic CO<sub>2</sub> Scrubber") from the exhaust gas prior to directing the exhaust gas into the ozone generator (9c).

Although appellants state at page 5 of the Brief that "no details of operation are disclosed," they do not dispute the examiner's finding that the drawings in the Fritzvold reference either taught or would have suggested to one of ordinary skill in the art the above-mentioned claim limitations. See also In re Meng, 492 F.2d 843, 847, 181 USPQ 94, 97 (CCPA 1974) ("a claimed invention may be anticipated or rendered obvious by a drawing in a reference whether the



drawing disclosure be accidental or intentional"). The dispositive issue is, therefore, whether it would have been obvious to obtain a recycle gas containing the claimed level of contaminant, i.e. carbon dioxide, prior to introducing the resulting recycle gas to an ozonator.

As indicated by the examiner at pages 3 and 6 of the Answer, the Namba reference describes (column 2, lines 34-39) that:

The inventors have studied and found that when the gas in the oxygen recycle system comprises 90 to 95% of oxygen and 5 to 10% of nitrogen, a superior ozonizing effect can be obtained by using a CO<sub>2</sub> gas concentration of 1 to 2% in comparison with that of zero.

Although the Namba reference teaches preference for including a CO<sub>2</sub> gas concentration of 1 to 2% in an oxygen recycle stream for ozone generation, it does not foreclose one of ordinary skill in the art from employing a higher concentration of carbon dioxide in the oxygen recycle stream. In fact, appellants acknowledge at page 6 of the Brief that it is known to those skill in the art to employ an oxygen gas containing a carbon dioxide concentration up to 10 wt% to generate ozone with little loss in energy yield. The

declaration by Spencer W. Eachus proffered by appellants under 37 CFR § 1.132 also acknowledges that "it is known that the CO<sub>2</sub> level affects the efficiency of ozone generation in the oxygen stream." See page 1. Appellants further acknowledge (Brief, pages 6 and 7) that:

Ozone generation efficiency depends on a variety of factors other than carbon dioxide content and overall oxygen purity. The general effect of various factors is discussed in Nebel, Ozone, "Encyclopedia of Chemical Technology", vol. 16, pp. 693-96 (3d ed., John Wiley & Sons 1981). Of the various factors discussed, generator size, power density and flow rate most directly impact on the cost of generation. Thus, it would appear to be possible to maintain apparent generation efficiency at high carbon dioxide levels. Although increasing the generator size, reducing power density or reducing the actual flow rate maintains an apparent efficiency, there is a tradeoff in the capital costs are increased or productivity is decreased.

Given the above facts, we agree with the examiner that it would have been prima facie obvious to one of ordinary skill in the art to treat a recycle oxygen gas stream in the carbon dioxide scrubber illustrated in the Fritzvold reference to have the claimed carbon dioxide concentration level for the purpose of ozone generation in the bleaching process shown and described in the Fritzvold reference with a reasonable

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expectation of producing an ozone-enriched gas useful for bleaching pulp. Not only is the concentration level of carbon dioxide recognized

in the art as a result effective variable (see In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936-37 (Fed. Cir. 1990); In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980)), but also one of ordinary skill in the art would have had an economic incentive to use a recycle gas stream having a higher carbon dioxide concentration level, such as that claimed, for a given system to reduce the cost associated with removing carbon dioxide from the recycle oxygen gas stream (obtaining a high purity oxygen gas) and replenishing the recycle oxygen gas stream with costly oxygen for the purpose of operating the ozonator at near or full capacity, at the expense of energy efficiency and ozone yield (see In re Thompson, 545 F.2d 1290, 1294, 192 USPQ 275, 277 (CCPA 1976); In re Clinton, 527 F.2d 1226, 1229, 188 USPQ 365, 367 (CCPA 1976)).

As a rebuttal to the prima facie case of obviousness, appellants rely on a Rule 132 declaration of Spencer W. Eachus. See Brief, page 9. According to appellants (Brief,

page 9), it establishes that the claimed subject matter imparts unexpected results. Having reviewed the showing in the declaration, we agree with the examiner that appellants have not met their burden of showing unexpected results. See In re Geisler, 116 F.3d 1465, 1469-70, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); In re Klosak, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972); In re Heyna, 360 F.2d 222, 228, 149 USPQ 692, 697 (CCPA 1966).

Initially, we note that it is not enough that the results for appellants' invention and a supposed prior art invention are different. Appellant must demonstrate that such results are unexpected. Geisler, 116 F.3d at 1469-70, 43 USPQ2d at 1365; Klosak, 455 F.2d at 1080, 173 USPQ at 16. However, as indicated supra, it is known that as the level of impurity, especially carbon dioxide, in a recycle oxygen gas increases, the ozone yield and ozone generation efficiency are adversely affected. Reducing the impurity and substituting costly oxygen for the impurity in a recycle oxygen gas, however, is reasonably expected to increase the purification cost and the cost associated with supplying replacement oxygen. As found

by the examiner (Answer, page 6), we determine that balancing the above cost affecting factors for a given system, depending on various equipment and process variables, including the transient price of oxygen, to maximize the cost saving would have been reasonably expected by one of ordinary skill in the art, particularly since appellants acknowledge that it is known that the above cost affecting factors are impacted by other known process and equipment variables. See Brief, pages 6 and 7.

Secondly, we observe that the showing in the declaration is not reasonably commensurate in scope with the degree of protection sought by the appealed claims above. See In re Kulling, 897 F.2d 1147, 1149, 14 USPQ2d 1056, 1058 (Fed. Cir. 1990); In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 778 (Fed. Cir. 1983). While the showing appears to be based on a single system configuration, the above claims are not so limited. According to appellants (declaration, page 2, paragraph 7):

Optimum operation is dependent upon system configuration, and operating costs are a balance between the cost for oxygen makeup and the cost of the power to generate ozone.

Appellants also acknowledge that other factors, such as "generator size, power density and flow rate[,] most directly impact on the cost of generation." Brief, page 7. In other words, the showing of an unexpected result in one system configuration does not extend to other system configurations covered by the present claims.<sup>4</sup>

Finally, it cannot be ascertained from the declaration what in fact caused the alleged improved results. Heyna, 360 F.2d at 228, 149 USPQ at 697 ("[t]he cause and effect sought to be proven is lost here in the welter of unfixed variables"). In this regard, we note that nowhere does the declaration specify the types of system configurations compared and the types of process and equipment variables employed.

Thus, we conclude that the evidence of obviousness regarding the above subject matter, on balance, outweighs the evidence of nonobviousness proffered by appellants. Hence, we agree with the examiner that the above subject matter as a

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<sup>4</sup> Although the showing, for example, requires purging (the declaration, page 3), appealed claim 1 does not require such a step.

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whole would have been obvious to one of ordinary skill in the art. Accordingly, we affirm the examiner's decision rejecting claims 1, 2, 4 through 7, 15 through 20, 33 through 36 and 51 through 54 under 35 U.S.C.

§ 103.

However, claims 8 through 11, 13, 14, 37 through 44 and 46 through 50 are on a different footing. As argued by appellants (Brief, page 10), the examiner initially has not established that it would have been obvious to employ each and every purification step recited in claim 8 and its dependent claims. The examiner does not supply any evidence that would have motivated one of ordinary skill in the art to employ various purifications steps, especially a step for removing entrained pulp fibers from the exhaust gas. For example, nowhere does the examiner demonstrate that the existence of entrained pulp fibers in the exhaust gas, much less the removal of such fibers from the exhaust gas, is known at the time the present application was filed. As also argued by appellants (Brief, pages 13-14), the examiner has not established that it would have been obvious to reuse a purge gas containing impurities in a pulp consistency increasing

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step in the manner recited in claim 13 and its dependent claims. We adopt appellants' reasoning at pages 13 and 14 of the Brief as our own.

As a final point, we advise both the examiner and appellants to review the contents of Norwegian Patent Application Nos. 77 1473 and 77 1474 referred to in the Fritzvold reference before the issuance of a patent on this application. It appears that the above-mentioned Norwegian Patent Applications are the closest prior art. See Fritzvold, columns 7 and 8. They may affect the patentability of the subject matter recited in some or all of the appealed claims.



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In summary,

(1) the rejection of claims 1, 2, 4 through 7, 15 through 20, 33 through 36 and 51 through 54 under 35 U.S.C. § 103 is sustained; and

(2) the rejection of claims 8 through 11, 13, 14, 37 through 44 and 46 through 50 under 35 U.S.C. § 103 is not sustained.

Accordingly, the decision of the examiner is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

MICHAEL SOFOCLEOUS	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
CHUNG K. PAK	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
TERRY J. OWENS	)	
Administrative Patent Judge	)	

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jrg

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Appeal No. 94-4357

Serial No.

07/739,050

Judge PAK

Judge OWENS

Judge SOFOCLEOUS

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DECISION: AFFIRMED-IN-PART

Send Reference(s): Yes No  
or Translation(s)

Panel Change: Yes No

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Brief or Heard

Group Art Unit: 1303

Index Sheet-2901 Rejection(s): \_\_\_\_\_

Acts 2: \_\_\_\_\_

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